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ABSTRACT

The school performance of pupils in grades 1-3 of the French immersion program in operation in Ottawa public schools is evaluated in comparison with that of pupils in the regular English program. The results indicate that by the end of grade 1 immersion program pupils taught reading in French are found to lag behind their peers in the regular program in English language skills involving English reading, but they show some ability to transfer reading skills from French to English. By the end of grade 2, following the introduction of English Language Arts into the curriculum for 60 minutes a day, immersion pupils still lag behind their regular program peers in most English language skills considered, although their level of performance is consistent with their grade level. By the end of grade 3, immersion pupils match regular program pupils in all English language skills tested except spelling. Throughout grades 1-3 pupils in the two programs perform equivalently in mathematical skills and show the same level of cognitive development. Immersion pupils reveal a considerably higher level of proficiency in French than pupils of corresponding or higher grade levels receiving daily instruction in French as a second language, and do reasonably well in comparison with native French-speaking pupils. (Author)

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BILINGUAL EDUCATION PROJECT: EVALUATION OF THE 1973-74 FRENCH IMMERSION PROGRAM IN GRADES 1-3 IN THE FEDERAL CAPITAL'S PUBLIC SCHOOLS

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Bilingual Education Project: Evaluation of the 1973-74 French Immersion Program in Grades 1-3 in the Federal Capital's Public Schools[1,2]

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This report is concerned with the Spring 1974 evaluation of the French immersion program in the Federal Capital's public schools, undertaken by the Bilingual Education Project of the Ontario Institute for Studies in Education. It details the findings obtained from the administration of a battery of tests during April, May and June 1974 to Grade 1, 2, and 3 classes. Fifteen schools of the Ottawa Board of Education and five schools of the Carleton Board of Education were involved in the testing program.

The evaluation continues the investigation of the two basic questions asked by the school and by the Board of Education authorities at the start of the program in 1970:

1) Does instruction of the prescribed curriculum through the medium of a second language (French) have any harmful effects on native language (English) skills, on achievement in such basic academic skills as reading and arithmetic, or on the pupil's IQ and general cognitive development?

2) How beneficial is the French immersion program with regard to proficiency in French when compared with the regular school program in which French is taught as a regular school subject and all other instruction is in English?

To consider these questions, comparisons are made between pupils in the immersion program and comparable pupils enrolled in the regular English program in the Ottawa public schools.

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[1] For footnotes, see p. 26.

Description of Ottawa Immersion Program through Grade 3

A detailed description of the immersion program in operation in Ottawa public schools is to be found in the Appendix (p.24). Briefly, all instruction in Kindergarten and Grade 1 is in French. In Grade 2, formal instruction in English Language Arts is introduced for one hour per day, and the rest of the curriculum continues to be taught in French. The same format is followed in Grade 3.

Summary of Previous Findings

The Ottawa French immersion program was started at the Kindergarten level in September 1970. Pupils entering the program at that time, who were consequently in Grade 3 in the current evaluation (1973-74), are referred to as Cohort I. The two subsequent streams of pupils with which this report is also concerned, those entering the Kindergarten program in September 1971 (and in Grade 2 in 1973-74) and in September 1972 (in Grade 1 in 1973-74) are referred to as Cohorts II and III respectively.

Briefly, at the end of Kindergarten, all three cohorts generally showed the same degree of readiness for beginning school work in Grade 1 as did pupils enrolled in the regular English Kindergarten program. In terms of French comprehension, the pupils in the immersion program were superior to regular program pupils of Kindergarten as well as of higher grade levels who were receiving daily periods of French as a second language. There was no indication of any setback in cognitive development on the part of immersion program pupils.

At the end of Grade 1 (Cohorts I and II), pupils in the immersion program lagged behind their peers in the regular English program in English language skills involving reading, attributable to the fact that they had not yet received any formal instruction in English Language Arts. However, they showed a substantial amount of transfer of reading skills from French to English. In arithmetic achievement, immersion pupils taught in French were comparable to regular program pupils taught in English; they could thus transfer mathematical concepts from French to English. In French performance, though not on a par with native French-speaking Grade 1 pupils, immersion pupils were superior to pupils in the regular English program who were receiving instruction in French as a second language. There was again no evidence of any harmful effect of the immersion

experience on cognitive development.

At the end of Grade 2 (Cohort I), pupils in the French immersion program, who had begun formal instruction in English Language Arts in Grade 2, had caught up to their peers in the regular program in English reading and other English language skills with the possible exception of spelling. They continued to perform equivalently to regular program pupils in arithmetic, and to show the same level of cognitive development. In French performance, they were still not at par with French-speaking Grade 2 pupils, but were superior to pupils in the regular English program who had been taking French as a second language since Kindergarten.

A detailed discussion of the findings of all evaluations prior to the present one, in relation to all three cohorts, is presented in Barik and Swain, in press.[3]

Present Evaluation (1973-74)

Subjects and Procedure. The testing program of the Bilingual Education Project (BEP) calls for the evaluation of three successive cohorts at each grade level. Consequently, since the Kindergarten immersion program had been evaluated for three successive years, that grade level was not included in this year's evaluation, which involved only Grades 1, 2, and 3. The BEP will continue to consider Cohorts I, II, and III as they progress through each grade level.

The BEP has tried in its evaluation to follow the same student population initially associated with any one cohort. Thus pupils in the Grade 3 1973-74 evaluation generally correspond to the same group of pupils who were tested in Kindergarten in 1970-71, those in Grade 2 to the same group who began Kindergarten in 1971-72, and those in Grade 1 to the same group who began in 1972-73. A number of relocations of immersion centres over the period considered, however, has entailed a certain degree of variation in the composition of the samples over the years, and the occasional substitution of one school for another at a particular grade level in the testing program. In such instances, substitutions have taken into consideration the socioeconomic and other demographic characteristics of the schools involved, so as to retain the comparability of the immersion and regular program samples with respect to such factors.

In 1973-74 there were a number of "split" classes in schools of both the Ottawa and Carleton Boards of Education, which combined in

one class pupils of two grade levels. Thus, there were classes combining pupils from Grades 1 and 2, Grades 2 and 3, and Grades 3 and 4. Such classes were to be found both in the immersion and regular programs. In the BEP evaluation, each grade level has been considered a separate class (and pupils from each grade level of both may have been included in the testing program). In immersion centres, at least one immersion class from each grade level at which the program was offered was included in the testing sample. The number of classes involved in the testing is as follows:

Grade	Immersion Program	Regular Program
1	15 classes	14 classes
2	14 classes	14 classes
3	9 classes	10 classes

Unlike in 1972-73 when only samples of pupils from each class selected were tested, this year classes were tested in full, as requested by the school board authorities. In order to be consistent with the testing procedures carried out by the Research Center of the Ottawa Board of Education, BEP tested all pupils in any one class (or grade section in the case of split classes) together, rather than divide the class into two or more sections as had been done in the previous evaluations whenever the number of pupils in the class exceeded the maximum number to be tested as recommended in the test manuals.

Testing was carried out either in a separate room set up specifically for this purpose or in the pupils' regular classroom. Some tests were administered in several sittings as specified in the test manuals. The tests were administered by a team of two trained female testers, one of whom gave the test, while the other ensured that the children were at the right place in the test and did not copy one another's work. For the English tests, the testers were native, or native-like speakers of English, while for the French tests, the directions were given by a fluently bilingual native or native-like speaker of French.

Although all pupils within a class were included in the testing program, a number were subsequently eliminated from the analysis on the basis of several criteria, namely:

a) pupils who teachers indicated had special problems (e.g., serious hearing or vision difficulties, emotional problems);

b) pupils who teachers indicated had a very limited ability to understand and express themselves in English (e.g., very recent immigrants);

c) pupils who were repeating a grade or conversely those who had entered their grade level only in January or later of the current school year. (The Ottawa Board of Education has a tri-entry system, whereby pupils can enter or move from one grade level to another three times during the year).

d) pupils whose age fell outside a certain limit (±18 months from "normal" age of 6 years for Grade 1, 7 years for Grade 2, 8 years for Grade 3), as a way of excluding pupils who probably belonged to c) above but where this information was not specified;[4]

e) pupils who had switched from one program to the other (immersion or regular) as of a specified date, depending upon the grade level.

As a consequence of these criteria, the number of pupils involved in the analysis is as follows:

Grade	Program	
	Immersion	Regular
Grade 1	265	250
Grade 2	300	262
Grade 3	173	206

Along similar lines, in the case of performance in French all French scores of any pupils who came from a home background where French, either by itself or in conjunction with another language (English or other) was spoken as a regular means of communication (as indicated from a linguistic code assigned by the teacher) were eliminated from the analysis.[5]

Design of Analysis.

In the evaluation that follows, differences between the immersion and comparison groups are analyzed through one-way analysis of variance as well as through analysis of covariance using age and IQ as covariates. The substantial number of classes involved in the evaluation of the Ottawa study makes it possible to use the class rather than the individual as the unit of analysis; thus class means rather than individual scores serve as the data. In a few instances where only two or three classes were administered a specific test, however, the group average is calculated on the basis of individual scores rather than on the basis of class means.

Grade 1 Tests and Results (Cohort III)

The battery of tests administered to Grade 1 pupils was the same as in previous evaluations. The results are presented in Table 1 at the back of the report.

1. Otis-Lennon Mental Ability Test (Elementary I Level, Form J). This general intelligence test measures the pupil's facility in reasoning and in dealing abstractly with verbal, symbolic and figural materials covering a broad range of cognitive abilities. Test items of a pictorial nature are concerned with the mental processes of classification, following of directions, quantitative reasoning, comprehension of verbal concepts, and reasoning analogy. Taking age into consideration, the raw scores are converted into standardized Deviation IQ scores (DIQ) which provide an index of mental ability.

As seen in Table 1, there is no reliable difference between the two groups on measured IQ, the immersion group obtaining an average score of 114.3 to the comparison group's 113.0. This finding differs from last year's when the same cohort was in Kindergarten, at which time the immersion group scored significantly higher at the end of the year than the regular program group. (The finding, however, just reached the $p=.05$ level.) The difference can very likely be attributed to some changes in the composition of the groups; whereas only samples from each class were selected in 1973, all pupils in each class tested were included in this year's evaluation. The end-of-year Kindergarten IQ measures for Cohort III (115.3 for immersion group; 111.4 for comparison group) are in fact not very different from those obtained at the end of Grade 1 this year. The difference between this year's findings and last year's should thus not be interpreted as indicating a drop in the IQ level of pupils in the immersion program relative to those in the regular program in the course of Grade 1.

In terms of American norms, both Grade 1 groups this year score in the vicinity of the 80th percentile.

Table 1 also shows that there is no reliable difference between the two groups in chronological age, which parallels last year's finding relative to the same cohort in Kindergarten.

2. Metropolitan Achievement Tests (Primary I Battery, Form B). This test (MAT) is concerned with reading and arithmetic skills taught in Grade 1, and consists of four sections. The first section, word knowledge, measures the child's sight vocabulary or word recognition ability in English. The child must select from four alternatives the proper word which refers to a given picture. The second section, word discrimination, measures the child's ability to select an orally presented English word from four alternative printed words bearing certain sound similarities, thus requiring both auditory and visual discrimination. The third section, reading, measures the child's reading comprehension of sentences and paragraphs in English. The fourth section, arithmetic concepts and skills, provides a comprehensive measure of the child's mastery of basic numerical and quantitative concepts, his ability to solve verbal problems, and to perform addition and subtraction exercises. No reading is involved in this section.

The form of the Test employed in 1974 (Form B) was different from the one used in 1973 (Form A), but the format is the same. Raw scores from each subtest are converted to standard scores in the analysis.

Since the first three sections of the test involve reading in English, it is not surprising that the French immersion pupils, who have had no formal training in English, score significantly lower than the regular program pupils on all three sections ($p<.001$ when scores are adjusted for age and IQ, see Table 1). Immersion pupils, however, still score between the 45th and 60th percentile on these parts of the test, indicating a substantial amount of transfer of reading skills (acquired in French) from French to English.[6] (The comparison group, as seen in Table 1, scores in the 70-80th percentile range.) In terms of (American) grade equivalents, the mean of the immersion children is in fact equal to the average score of pupils in the ninth month of Grade 1, i.e., May, approximately the time at which the test was given, in word knowledge and reading, and to the average score of pupils in the third month of Grade 2 in word discrimination. These figures serve to underline the significance

of the extent of transfer of reading skills from French to English without formal instruction in English Language Arts, and suggest that the lag of immersion pupils in English language skills relative to pupils in the regular program (whose grade equivalents are in the 2.1-2.6 range) may be substantially reduced in subsequent grades, with the introduction of formal instruction in English Language Arts into the curriculum.

On the arithmetic section of the MAT, as seen in Table 1, there is no reliable difference between the two groups on total subtest score. In terms of American norms, both groups score in the vicinity of the 65-70th percentile range, and at a grade equivalent level of 2.2 (second month of Grade 2).

The arithmetic section can be subdivided into two parts, one composed of items presented verbally and involving problem solving and the following of directions (33 items), and the other of items involving computation which do not require verbal presentation (30 items). Interestingly, as seen in Table 1, the immersion group scores significantly higher ($p<.001$) than the comparison group on the computational items, on the basis of either unadjusted or adjusted scores. It is also to be noted that both groups score very high on those items, immersion pupils in fact obtaining a near-perfect score of 29 out of 30. There is no reliable difference between the two groups on the verbal mathematical items.

The results on the MAT with the Grade 1 group of Cohort III thus parallel those obtained the previous two years with the Grade 1 groups of Cohorts I and II: (a) a significantly better level of achievement on the part of regular program pupils on sections involving English language skills related to reading, but still a strong indication of transfer of reading skills by immersion pupils from French to English prior to the introduction of English Language Arts into their curriculum; (b) no difference between the two groups on arithmetic achievement (on the basis of the total subtest), indicating that pupils in the French immersion program in Grade 1 master as much mathematical knowledge through French as pupils in the regular English program do through English, and can transfer this knowledge from one language context to the other. (The transfer, moreover, is not limited to computational skills but also to the comprehension of verbal mathematical problems and statements.)

3. French Comprehension Test (Kindergarten & Grade 1 Levels, 1974 edition).

The French Comprehension Test (FCT) is a test developed by the Bilingual Education Project to measure the child's comprehension of French since no other published tests of French as a second language have been found to be suitable for use in the early immersion classes. The 1974 editions of the FCT (both Kindergarten and Grade 1 Levels) were revised from the 1973 versions of the test through the elimination or revision of inadequate items (low discrimination index) revealed in the item analysis, and the addition of some new items. An attempt was made to increase the difficulty of the test relative to last year's versions.

The FCT continues to have the same format as the 1973 version and consists of four parts. The first part, words, requires the child to identify the picture referred to by a spoken French noun. The second, phrases, requires the child to choose the picture which illustrates a spoken French phrase or sentence. The third, questions, measures the child's ability to select the correct pictorial answer to a question in French. The fourth, stories, requires the child to choose the correct pictures in answer to questions concerning short stories which have been read aloud in French. There are 62 items in the Kindergarten Level test and 65 in the Grade 1 Level test. The test is administered in two sittings.

All Grade 1 immersion classes took the Grade 1 Level test, while among the regular program classes 7 took the Kindergarten and 7 the Grade 1 Level.[7]

The results are shown in Table 1 (and again in Table 4).[8] As seen, the immersion group's performance is far superior to that of the regular group on the Grade 1 level test: 46.1 to 18.7 (the difference is significant at $p<.001$ on the basis of both unadjusted and adjusted scores). On the Kindergarten Level test, Grade 1 regular classes obtain a score of 29.4 out of 62.[9]

The 1974 version of the Grade 1 test did prove to be a bit more difficult than the 1973 version, the immersion group scoring 71% on this year's test as opposed to 78% obtained last year (by Cohort II). Likewise, Grade 1 regular program pupils score somewhat lower on the 1974 Grade 1 version (29%) than those of the preceding cohort did on the 1973 version (38%). The Kindergarten Level test, on the other hand,

appears to be of equivalent difficulty to last year's, regular program classes scoring 47% on this year's version, which is the same figure as obtained by Cohort II classes last year on the 1973 version of the test. Both this year's and last year's regular program Grade 1 classes have had the same amount of contact with French through Kindergarten and Grade 1, which makes these comparisons appropriate.

4. Test de Rendement en Français, Grade 1 (1971). This test has been developed by the Commission des Ecoles Catholiques de Montréal[10] and standardized on a population of Grade 1 children in Montreal whose native language is French. It consists of 30 items involving the identification of sounds, word definitions, vocabulary, spelling and sentence comprehension in French. The Test de Rendement en Français (TRF) was administered completely in French to the immersion classes only.

In comparison with the norms established for French-speaking pupils in Montreal, the score of 13.6 obtained by the immersion pupils (Table 1) corresponds to a stanine of 3, which indicates that the French immersion children do as well as from 11 to 22 percent of the French-speaking children. Last year the immersion group obtained a slightly higher score of 14.5 on the test. However, the test was administered considerably earlier this year than last (start of April vs. first half of June in 1973), to make the comparison with native French speakers (administered the test in late March) more valid. Last year's group thus benefitted from a 2-2 1/2 month administration delay relative to French students in Montreal and to this year's immersion group.[11]

Grade 2 Tests and Results (Cohort II)

The five tests administered at the Grade 2 level represent for the most part higher levels of the tests given in Grade 1. The results are presented in Table 2.

1. Otis-Lennon Mental Ability Test (Elementary I Level, Form J). This is the same test as was administered to Grade 1 classes, but a higher raw score is necessary for an equivalent DIQ score since the DIQ scores are calculated according to age.

As seen in Table 2, there is no reliable difference between the two groups on measured IQ, paralleling the findings obtained last year with the same cohort in Grade 1. There is thus no evidence of any differential effect of type of program (immersion vs. regular) on cognitive development in the course of Grade 2.

The Grade 2 average IQ scores are almost identical to those recorded for Grade 1 (Table 1), and fall at approximately the 80th percentile on the basis of American norms. In relation to last year, both Grade 2 groups score slightly higher (by 3-5 DIQ points) than the same cohort did in Grade 1 (immersion group: 114.2 in Grade 2 vs. 109.1 in Grade 1; Comparison group: 113.1 in Grade 2 vs. 110.1 in Grade 1).

Table 2 also indicates that there is no reliable difference between the two Grade 2 groups in chronological age. (The same finding was noted with the same cohort in Grade 1.)

2. Metropolitan Achievement Tests (Primary II Battery, Form F). This is the level of the MAT series designed for testing children at the end of Grade 2. The test consists of three sections measuring English language and reading skills, one measuring spelling ability, and three measuring fundamental arithmetic concepts and skills. The first subtest, word knowledge, measures the extent of the pupil's English reading vocabulary. Some items require the pupils to select from four word choices the one which identifies a given picture, while others require the pupils to identify a synonym, antonym, or classification for a given word. The second subtest, word analysis, measures the child's knowledge of sound-letter relationships or skill in decoding in English. A dictated word must be selected from four printed words which have

similar configuration or sound patterns. The third subtest, reading, measures the child's comprehension of sentences and paragraphs in English. The fourth subtest, spelling, is a dictation-type measure of English spelling ability with each word being presented orally in a brief contextual sentence. The fifth subtest, mathematics: computation, measures the child's ability to add, subtract and multiply. The sixth subtest, mathematics: concepts, measures the pupil's understanding of basic mathematical principles such as place value, measurement, laws and properties of number systems, arrays, sets and inequalities. The seventh subtest, mathematics: problem solving measures the child's ability to apply knowledge in solving numerical problems. Approximately half the subtest consists of dictated items and half of problems which pupils read to themselves.[12] The problems cover addition, subtraction, multiplication, and division processes, rate, multiple-step problems and use of number sentences.

In the scoring, the three mathematics subtests are combined to yield a total mathematics score. Likewise the word knowledge and reading subtests (only) are combined to yield a total reading score. The raw scores for each section are converted to standard scores for analysis.[13]

The results are found in Table 2.[14] Concerning the English language skills sections of the test, there is no reliable difference between the two groups on any section except spelling ($p<.05$ in favour of the comparison group) when unadjusted scores are considered. However, when scores are adjusted for age and IQ, the comparison group scores significantly higher than the immersion group on all sections except word analysis (which, however, shows a similar trend, $p<.10$). The immersion group thus still lags somewhat behind the regular program group in English language skills involving reading/spelling in English at the end of Grade 2, after one year of formal instruction in English Language Arts for 60 minutes per day. These findings are at variance with those obtained in 1973 with the Grade 2 groups of Cohort I, which revealed no reliable difference between the two groups on any of the English language skills sections of the form of the test employed at the time

on the basis of either unadjusted or adjusted scores (although the difference on the spelling section when scores were adjusted for age and IQ did come very close to statistical significance).

Even though this year's Grade 2 immersion group does not appear to be at par with their peers in the regular program in English language skills on the basis of the statistical analysis, the difference between the two groups does not appear to be very salient in educational terms. As seen from Table 2, except for spelling, the immersion group scores at approximately the 70th percentile in relation to norms for all English skills sections of the test and in total reading performance, and the comparison group at approximately the 75th percentile on all sections. In terms of grade equivalents (G.E.), both groups are also slightly ahead of their own grade level (2.9), the immersion group scoring in the 3.0-3.3 G.E. range on all sections except spelling, where it scores at the 2.8 G.E. level, and the regular group in the 3.2-3.6 range. The Grade 2 immersion group's performance on the English language skills sections of the test is thus adequate, given the fact that it has only had one year of formal instruction in English Language Arts.

On the mathematics sections of the test, there is no reliable difference between the two Grade 2 groups on any of the three subtests (or on the further division of the problem solving sections into verbally presented and written problems), whether or not scores are adjusted for age and IQ. This finding parallels last year's with respect to the Grade 2 groups of Cohort I.

The results on the mathematics sections thus show that immersion pupils continue through Grade 2 to acquire mathematical concepts via French as well as their counterparts in the regular program do via English, and can transfer these concepts from one language context to the other. Since the problem solving section contains a number of problems in written form (18 out of 35 items), the results indicate that immersion pupils are able to read, comprehend, and solve mathematical problems in English as adequately as pupils in the regular program.

In terms of American norms, both groups score in the vicinity of the 60th percentile on the total mathematics score, with scores on individual sections ranging between approximately the 50th and 70th percentile. In terms of grade equivalents, both groups are performing at approximately their own grade level (2.9-3.0). These results are

somewhat lower than last year's with the Grade 2 groups of Cohort I, which scored at approximately the 75th percentile on the form of the test administered to them, but comparable to those of the same cohort (Cohort II) in Grade 1, which scored at approximately the 65th percentile on the arithmetic section of the Grade 1 test.

3. French Comprehension Test (Kindergarten and Grade 1 Levels).

Since a Grade 2 Level of the French Comprehension Test was not available, the Grade 1 level test was administered to 10 Grade 2 immersion classes.[15] Among regular program classes, 7 were administered the Grade 1 level test and 7 the Kindergarten level test.

The results are shown in Tables 2 and 4. The immersion group scores significantly higher than the comparison group on the total Grade 1 test and on all sections ($p<.001$), obtaining a total score of 53.1 to the comparison group's 22.2 (which is lower than the Grade 1 immersion group's score; see Table 4). As might be expected, both Grade 2 groups score higher than the corresponding Grade 1 groups (Table 4) on the same form of the test. The same applies to the regular program Grade 2 classes administered the Kindergarten Level test, who obtain a score of 38.6 out of 62 (to the Grade 1 classes' score of 29.4).

The Grade 2 immersion group's performance cannot be compared with last year's results, since in 1973 the Grade 2 immersion classes were administered another test, the IEA French Listening Test, Population I, which proved to be too easy.

4. Test de Rendement en Français, Grade 2 (1972). This is the test of achievement in French developed for French-speaking Grade 2 pupils by the Commission des Ecoles Catholiques de Montréal. The test consists of 30 items involving vocabulary, spelling, the identification of sounds, synonyms and antonyms, and sentence comprehension in French. The test was administered completely in French to the immersion classes only.

As shown in Table 2, the Grade 2 immersion pupils obtained a score of 14.9 on the test. A direct comparison with norms for the test cannot be made since the Grade 2 test is in fact administered to French-speaking pupils in the first half of the year, in late November, whereas the immersion pupils were administered the test in early April, so that the comparison is biased in their favour when relating their

performance to that of native French-speaking Grade 2 pupils. Bearing in mind this 4-4 1/2 month lag in the administration of the test, the Grade 2 immersion group scores in the stanine 4 range on the test,[16] which means that they are doing as well on it as from 23 to 39% of French-speaking Grade 2 pupils (taking the test in November).

5. Test de Lecture (2e année). This is an experimental reading test developed by the Bilingual Education Project to evaluate the reading skills of French immersion pupils at the Grade 2 level. The test consists of a number of short passages (9), each of which is followed by a series of questions on the content of that passage. (There are 19 questions altogether). The test was based on the recommendations of consultants to the French immersion program concerning the reading objectives of the program.

As seen in Table 2, the Grade 2 immersion pupils obtain a score of 11.6 on the test. Comparable data from native French-speaking pupils being educated in French would provide a useful yardstick against which to evaluate this level of performance. Such data may be collected in the future. At present, the only statement that can be made is that on the basis of consultants' opinions, the level of reading ability demonstrated by immersion pupils on the test is satisfactory.

Grade 3 Tests and Results (Cohort I)

The Grade 3 classes were administered a battery of tests similar to that in Grade 2, but of a higher level. The tests were as follows:

1. Otis-Lennon Mental Ability Test (Elementary I Level, Form K). This is the same level of the mental ability test administered to the earlier grades, which applies equally to grades 1-3. However, a higher raw score is required with a higher age range for an equivalent DIQ score. In Grade 3 a different but parallel form of the test was employed (Form K).

Table 3 shows that there is no reliable difference between the two Grade 3 groups on measure on mental ability, the immersion group obtaining an average IQ score of 116.3 and the comparison group a score of 113.1. These results parallel those obtained with the same cohort in all previous evaluations since Kindergarten, which have failed to reveal any difference between the two groups on cognitive measure. The scores are similar to those obtained by the two groups of the same cohort the previous year at the end of Grade 2 (113.7 for the immersion group, 111.8 for the comparison group). In terms of American norms, this year's Grade 3 IQ scores fall in the vicinity of the 80-85th percentile range.

There is thus no indication that pupils in the immersion program are being negatively affected in their cognitive development during the course of Grade 3.

Table 3 also shows that there is no reliable difference between the Grade 3 groups in chronological age, a finding which parallels that of previous evaluations with the same cohort.

2. Metropolitan Achievement Tests (Elementary, Form F). This is the test in the MAT series suitable for use in Grade 3. It consists of four English language skills sections and three mathematics sections. The English skills sections are: (a) word knowledge, similar to the same section in the Grade 2 test except that there are no pictorial stimuli, all items requiring pupils to identify synonyms, antonyms or word classifications being presented in sentence form; (b) reading, which in the Grade 3 test involves paragraphs only; the pupil reads a paragraph and

then answers questions about it which cover comprehending literal meanings of passages, drawing inferences from the material, identifying main ideas, and determining word meanings from context; (c) language, which measures the pupil's knowledge of basic conventions in standard written English. The section consists of two parts, one on "sentence sense", which contains items requiring pupils to identify whether given sets of words are "telling" sentences, "asking" sentences, or not sentences at all. The other part presents items requiring pupils to identify errors in punctuation, capitalization, or usage in written material; (d) spelling, similar to the same section in the Grade 2 test. As for mathematical skills, the three sections are of the same nature as in the Grade 2 test: computation, concepts (which involves considerably more reading of problems and answers than the Grade 2 test), and problem solving, which in the Grade 3 test consists entirely of written problems which the pupil reads to himself. As with the Grade 2 test, the word knowlege and reading subtests are combined to yield a total reading score and the three mathematics sections yield a total mathematics score. All raw scores are converted to standard scores for analysis.

Table 3 shows the results on the MAT.[17] As seen, there is no reliable difference between the two groups on any of the English skills sections on the basis of unadjusted scores, and the same holds except in the case of spelling when scores are adjusted for age and IQ. In the latter instance (spelling), the comparison group scores significantly higher than the immersion group ($p<.05$). Thus immersion pupils, introduced to English Language Arts in Grade 2 for one hour per day only, are on a par with their peers in the regular program taught entirely in English (except for a daily French period) in all aspects of English language skills tested except one. This contrasts with the Grade 2 results, where there was still some evidence of a slight lag on the part of immersion pupils relative to regular program pupils on the basis of adjusted scores . The Grade 3 results however parallel those obtained with the same cohort the previous year in Grade 2, where no difference was found between immersion and regular program pupils on English skills sections of the MAT used at the time on the basis of either unadjusted or adjusted scores, though in the latter instance the difference on the spelling section did come very close to statistical significance ($p=.06$), being thus

similar to this year's Grade 3 results.

In terms of American norms, the English skills scores of the immersion group fall approximately in the 65-75th percentile range, while those of the comparison group fall in the 70-75th range except on language, where the rank is somewhat lower (57th percentile). In terms of grade equivalents, both groups perform at a level above that of their present grade; grade equivalents for the immersion group range from 4.2 (spelling) to 4.7 (word knowledge and language), while those for the comparison group range from 4.3 (reading and language) to 4.6 (word knowledge).

On the arithmetic sections of the MAT, there is no reliable difference between the two Grade 3 groups on any of the three subtests or on the total mathematics score on the basis of unadjusted scores. When scores are adjusted for age and IQ, the difference on the problem solving section, favouring the comparison group, becomes statistically significant ($p<.05$). It should be recalled that this section consists entirely of written problems to be read by the pupils; it might thus be expected that immersion pupils, who in their formal English reading do not normally encounter mathematical material, would be at a disadvantage to pupils in the regular program with respect to this section of the test. On the basis of adjusted scores also, there is a trend for immersion pupils to obtain a lower total mathematics score than regular program pupils ($p=.10$), as a function mainly of the results on the problem solving section.

In terms of test norms, the immersion group scores approximately in the 70-75th percentile range on all mathematics sections, and the comparison group in approximately the 65-75th percentile range. The grade equivalent scores range of the two groups range from 4.2 to 4.7, with the total mathematics score of both groups corresponding to the performance level of pupils in the fifth month of Grade 4.

Through Grade 3, the immersion pupils being taught mathematics in French throughout their program are thus on a par with their peers in the regular English program, taught mathematics via their native language.

3. French Comprehension Test (Kindergarten and Grade 1 Levels).

The French Comprehension Test was not administered to Grade 3 immersion pupils, since neither level of the test was suitable for their level of proficiency in French comprehension. To obtain some data with respect to pupils in the regular English program, the Kindergarten level test was given to 2 regular Grade 3 classes and the Grade 1 level test to 3 other classes.

The scores for the regular program classes are shown in Table 3 (and Table 4). In view of the small numbers of classes involved, the average scores have been calculated on the basis of the individual pupils' scores rather than on the basis of the class means (although scores are approximately the same by the two methods). Pupils given the Kindergarten level test obtain a score of 31.1 out of 62, and those given the Grade 1 level test obtain a score of 24.8 out of 65 (which is lower than that of both Grade 1 and Grade 2 immersion classes, see Table 4). It is to be noted that the Kindergarten test score for regular program Grade 3 pupils is in fact lower than that of regular program Grade 2 pupils (38.6). This may be explained on the basis of the different amounts of French instruction associated with the various groups. Through Grades K-3, Grade 3 regular program pupils (Cohort I) have followed a program involving 15-20/20/20/20 minutes of daily French instruction at grade levels K/1/2/3 respectively. Thus by the end of Grade 3 regular program pupils have had a cumulative amount of French instruction equivalent to 75-100 minutes a day for one school year. In comparison, the Grade 2 regular pupils (Cohort II) have followed a program involving 20-30/20-40/20-40 minutes of French per day in Grades K/1/2 respectively (the amount varying as shown according to the school board, the first figure at each grade level relating to the program followed by the Carleton Board of Education, the second by the Ottawa Board of Education), for a cumulative amount equivalent to 60-110 minutes a day for one school year (depending upon the school board). On a cumulative basis, some Grade 2 classes have thus had more French instruction than Grade 3 classes. Of the 7 Grade 2 classes administered the Kindergarten level of the FCT, five were associated with the (cumulative)110 minute program and two with

the (cumulative) 60 minute program. Thus on the average Grade 2 regular program classes taking the Kindergarten FCT had had more French than Grade 3 classes taking the same test, possibly explaining their better performance on the test (38.6 to 31.1). This time element explanation, however, does not hold in the case of the Grade 1 level test results, where the Grade 3 pupils score slightly higher than the Grade 2 classes (24.8 to 22.2). Here also, Grade 2 classes would have had more French on the average than Grade 3 classes, since of the 7 Grade 2 classes taking the Grade 1 level test, six belonged to the (cumulative) 110 minute program and one to the (cumulative) 60 minute program.

4. Test de Rendement en Français, Grade 3 (1973). This is the test of achievement in French employed for French-speaking Grade 3 pupils in Montreal in schools under the jurisdiction of the Commission des Ecoles Catholiques de Montréal. The test consists of 30 items involving ten topics such as synonyms, antonyms, the rearrangement of words into a sentence, familiarity with alphabetical sequences, familiarity with tenses, stylistics, and other items. The test was given in French to French immersion classes only.

As seen in Table 3, Grade 3 immersion pupils obtained a score of 18.2 out of 30 on the test. In terms of norms for the test, this corresponds to a stanine of 4, indicating performance equivalent to that of from 23 to 39% of native French-speaking Grade 3 pupils and thus comparable to the level of performance obtained with Grade 2 classes. However, as in the case of Grade 2 classes, the comparison with norms must be qualified by the fact that the test was administered to immersion pupils 4-4 1/2 months later than it is given to native French speakers (who are administered the test in late November, whereas Grade 3 immersion pupils were given the test in early April), so that immersion pupils are at an advantage in this comparison.

5. Test de Lecture, 3e année. This French reading test was developed by the Bilingual Education Project to evaluate the reading skills of French immersion pupils at the Grade 3 level. As in the case of the Grade 2 test,

it was based on the recommendations of consultants to the French immersion program. The test consists of 9 passages, each of which is followed by a series of questions (28 altogether).

The Grade 3 immersion pupils obtained a score of 20.3 on the test (Table 3). Although no comparable data for native French speakers is available, the score appears to represent a satisfactory level of reading performance in French.

6. IEA Listening Test of French as a Foreign Language, Population II.

On a try-out basis, this test was administered to three Grade 3 immersion classes. The test was designed by the International Association for the Evaluation of Educational Achievement (IEA) and is intended for 14 year-old pupils currently studying French who have had two or three years of standard French instruction. Thus the test is not particularly appropriate conceptually for Grade 3 pupils. The pupil is presented with a spoken taped text and then asked to answer multiple-choice questions in French based on these texts. Items at this level have both pictorial and written answer choices, so that the ability to read in French is required. There are 40 items.[18]

Table 3 shows that Grade 3 immersion pupils administered the test obtained a score of 29.2 out of 40. Although there are no appropriate norms with which to compare this level of performance, the results seem quite adequate in view of the fact that the format and content of the test are designed for considerably older pupils.

It should be pointed out that the same test was administered last year on an experimental basis to two Grade 2 French immersion classes (thus of the same cohort as this year's Grade 3 classes). The Grade 2 pupils obtained a score of 28.2, which is approximately the same as that obtained by Grade 3 pupils. However, the Grade 2 pupils last year were allowed slightly more time per item and given additional examples, thereas this year's Grade 3 pupils took the test under the same conditions as followed by IEA with 14 year-old pupils. It may also be that in view of the advanced conceptual level of the test for both Grade 2 and Grade 3 pupils, the French listening skills of these two grade levels cannot be differentiated on the basis of the test.[19]

Summary

The results of the testing program carried out in Spring 1974 in Grades 1-3 may be summarized as follows:

1. At the end of Grade 1, pupils in the French immersion program:

a) are behind their English-speaking peers attending the regular English program in English language skills which involve reading (word knowledge, word discrimination and sentence or paragraph reading). However, their level of achievement in such tasks indicates a substantial amount of transfer of reading skills from French to English, even without formal instruction in English;

b) have mastered as much mathematical knowledge via French as the pupils attending the regular English program have via English, and can transfer this knowledge from French to English;

c) show no evidence of a decrease in general mental and cognitive development relative to their peers in the regular English program;

d) although not at a par with their native French-speaking peers in terms of French achievement, demonstrate a level of proficiency in French comprehension far superior to that of pupils in Grades 1-3 of the regular English program, who have been receiving 20-40 minutes a day of instruction in French as a second language since Kindergarten.

2. At the end of Grade 2, pupils in the French immersion program:

a) following the introduction of formal instruction in English Language Arts for one hour per day, still show a lag in English language skills, notably spelling, relative to their peers in the regular English program, though they in fact perform at a level commensurate with their level of schooling;

b) continue to show that they are learning as much mathematics via French as their peers instructed in English, and that they can transfer this knowledge from French to English;

c) show the same level of cognitive development as pupils in the regular English program;

d) although still not at par with their native French-speaking peers in French achievement, exhibit a level of proficiency in French comprehension superior to that of pupils in Grades 1-3 of a regular English program involving daily periods of instruction in French as a second language from Kindergarten on. They also show a satisfactory

level of performance in French reading.

3. At the end of Grade 3, pupils in the French immersion program:

a) are performing on a par with their peers in the regular English program in all aspects of English language skills tested except spelling;

b) continue to show the same level of proficiency in mathematics as their peers taught the subject in English, although they may be at a slight disadvantage in relation to the comprehension of written mathematical problems;

c) show the same level of cognitive development as pupils in the regular English program;

d) although not at par with their native French-speaking peers in French achievement, perform satisfactorily on measures of French reading and listening comprehension.

The overall impression which emerges from the findings of the Spring 1974 evaluation of the French immersion program in the schools under the jurisdiction of the Ottawa and Carleton Boards of Education is one of optimism concerning its viability and the attainment of the objectives for which it was designed.

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APPENDIX

Description of the French Immersion Program
In the Carleton and Ottawa Boards of Education

(Prepared by G. Lake)

During the 1973-74 school year the French immersion program being evaluated by the Bilingual Education Project in the Carleton Board of Education and the Ottawa Board of Education was offered at the Kindergarten and Grades 1, 2 and 3 levels. The program is a total French immersion program basically following the St. Lambert model (Lambert & Tucker, 1972)† in its philosophy, goals and structure. The overall aim of the program is to provide pupils with the opportunity of becoming functionally bilingual.

The P-J Curriculum Guidelines (1971) of the Ontario Department of Education providing guidelines for use by the Ontario Elementary School teachers for curriculum taught in the elementary grades of Ontario schools are followed in the immersion classes. Thus the aims and objectives of the curriculum and the general philosophy of education pursued in both the regular English classes and the immersion classes are the same.

The text materials used in the immersion classes are in French. These materials are, for the most part, materials which have been prepared for native speakers of French. In addition, supplementary materials are used which have been specifically developed for use in the immersion programs. These materials have been prepared by the class teachers, by consultants and by the Bilingual Education Project staff at the Ontario Institute for Studies in Education.

The majority of teachers in the immersion classes in both the Carleton and Ottawa Boards of Education are native speakers of French who also speak English.

Kindergarten

The Kindergarten children attend the program for one half day each school day. "From the first day of school, the teacher addresses the children exclusively in French; during the year the children respond in English or French. Throughout the year a natural development of the use of French by the child is fostered; the children are not forced to speak French at any time.

† Lambert, W.E., & Tucker, G.R. Bilingual Education of Children. Rowley, Mass.; Newbury House Publishers, 1972.

Grade 1

French is the language of instruction for all subjects. During Grade 1 the use of French by the pupils is encouraged in class. After Christmas the children are sufficiently comfortable with the French language and French becomes the language of communication in the classroom. During this year the children are taught to read and write in French. The French Language Arts programs used are the Méthode Dynamique (Centre de Pédagogie Dynamique, Auteuil, Que.) and Le Sablier (Le Sablier, Inc., Que.).

Grade 2

During Grade 2 French continues to be the language of instruction for all subjects except English. Formal instruction in English Language Arts is introduced at this level. The children receive one hour daily of English instruction. The program followed is either The Ginn Integrated Language Program (Ginn & Co., Toronto) or The Language Experience in Reading Program (Encyclopedia Britannica, Toronto). These classes are given by a teacher other than the French immersion classroom teacher. The English Language Arts teacher is usually an English-speaking primary teacher.

Grade 3

In Grade 3, French continues to be the language of instruction for all subjects except English which is given for one hour per day. The appropriate level of the English Language Arts programs given above are used.

Footnotes

[1] Thanks are expressed to the administrators of the Ottawa Board of Education and the Carleton Board of Education, and to the principals and teachers of the schools involved for their cooperation in this study. We also wish to thank Edna Nwanunobi for her assistance in the analysis of the data, and Grace Lake, who prepared the Appendix and acted as liaison with the two boards of education.

[2] The research reported in this paper was funded in part by a Grant-in-Aid of Educational Research from the Ministry of Education for the Province of Ontario.

[3] Barik, H.C., & Swain, M. Three-year evaluation of a large scale early grade French immersion program: The Ottawa Study. Language Learning, 1975 (in press).

[4] The evaluation is directed at pupils who are progressing at a "normal" pace in the curriculum, hence the exclusion of these children from the overall evaluation.

[5] On the basis of information collected on previous evaluations, it was noted that although the teacher might assign a linguistic code implying that both French and English were spoken at home as a regular means of communication, this information was sometimes not corroborated by parents, who would indicate that French was seldom employed in the home. Consequently, for pupils given a linguistic code suggesting a French-English background, their French performance measures were eliminated only if the pupil scored in the top third of his class on a specific French test. For regular program pupils, the French Comprehension Test (FCT) served as the criterion at all grade levels. For immersion pupils, the FCT served as the criterion in Grade 1. At the Grade 2 level, however, since not all immersion classes took the FCT, and at the Grade 3 level, where it was not administered, the Test de Rendement en Français served as the criterion. If a pupil did not have a score on the criterion test, another French measure, if available, was used as the criterion.

[6] The possibility must be recognized that some informal instruction in English reading occurs at home in the case of some pupils enrolled in the immersion program.

[7] In previous evaluations a number of classes were administered an English translation of the test to check on the conceptual adequacy of the items. Since the results on these administrations revealed that the tests were conceptually adequate, and since the present versions of the FCT do not depart substantially from previous ones in terms of conceptual content, the practice of administering an English translation of the test was discontinued.

[8] Since some pupils were present for one sitting of the test but not for the other, the composition of the classes was not constant for all sections of the test. This accounts for the slight difference between tabulated total FCT score and sum of subtest scores. The same applies to the FCT data in subsequent tables.

[9] This score is obtained excluding from the analysis one regular Grade 1 class from the Carleton Board of Education which, unlike the others, did not receive any instruction in French until Grade 1. If that class is included, the average on the Kindergarten level test drops slightly to 28.3.

[10] The Tests de Rendement of the C.E.C.M. have become the property of the Ministère de l'Education of the Province of Quebec, which now administers them. Thanks are expressed to both organizations and notably to M. Guy Huot of the C.E.C.M. and M. Nérée Bujold of the Ministère de l'Education, for their cooperation and for permission to use the tests in the evaluation.

[11] In previous evaluations, a French test of achievement in mathematics, the Test de Rendement en Mathématiques was also administered. The test was dropped from the battery in 1974, since achievement in mathematics is measured through the Metropolitan Achievement Tests.

[12] Reading of verbal or verbal-numerical answer choices is also required with some items in the mathematics concepts subtest.

[13] The form of the MAT used this year is different from the one employed last year with Cohort I (Primary II Battery, Form A, 1958). The latter had only two mathematical sections (concepts and problem solving being combined) and did not provide a total reading score. Various types of answer choices are also different in the two forms.

[14] As seen from the variation in the within-groups number of df's in Table 2, the analysis for the MAT does not involve all Grade 2 classes. For administrative reasons, one immersion class could not be given the test. In another school, formal instruction in English Language Arts is not introduced into the immersion program until Grade 3. Consequently, the MAT scores for the immersion class in that school relating to any section which involved English reading were excluded from the analysis (all subtests except the mathematics computation and concepts subtests, the latter involving a minimum amount of reading). The MAT analysis is thus based on the data of 12 or 13 immersion classes and 14 comparison classes.

[15] Due to printing problems, it was not possible to obtain a sufficient supply of French Comprehension Tests (both levels) in time for administration to all classes. This explains why only 10 of the 14 Grade 2 immersion classes were given the test. Likewise in Grade 3, supplies of test booklets could only cover 5 of the 10 classes.

[16] The immersion group's score of 14.94 just "makes it" at stanine 4, which has a score range of 15-18.

[17] The MAT data for the immersion class in the school which begins instruction in English Language Arts in Grade 3 only (see footnote 14) and which is thus not comparable in this respect with other immersion classes, have been excluded from the analysis, except in relation to the mathematics computation section which does not involve any English reading.

[18] Thanks are expressed to IEA for permission to use their test.

[19] In addition to the above tests, samples of paragraph writing in both French and English were obtained from some Grade 3 immersion classes, as well as of paragraph writing in English from classes in the regular English program. In addition, some samples of oral production in French were obtained from a number of pupils. These have not yet been analyzed.

TABLE 1

Unadjusted and Adjusted Means, Grade 1 (Ottawa-Carleton 1973-74)

	Unadjusted Means				Adjusted Means (covs.=age+DIQ)				Percentile Rank (Unadj. $\bar{X}$)	
	Immersion Group (15 classes)	Comparison Group (14 classes)	F ratio	df	Immersion Group	Comparison Group	F ratio	df	Immer. Group	Comp. Group
Age (Dec., May '74)	81.80	81.83	0.01	1/27						
Otis-Lennon DIQ (end yr.)	114.26	112.96	0.39	1/27					81	79
Metro. Achiev. Test (stand. sc.)[a]										
Word knowledge (20-65)	50.92	56.03	11.87**	1/27	50.59	56.38	34.02***	1/25	60	80
Word discrimination (21-64)	51.65	55.88	13.37***	1/27	51.46	56.09	22.36***	1/25	61	77
Reading (20-67)	46.88	52.27	6.79**	1/27	46.44	52.74	17.48***	1/25	45	69
Arithmetic (18-68)	52.48	50.92	1.85	1/27	52.27	51.15	1.50	1/25	71	65
a) Verbal Items (raw, mx=33)	24.44	23.56	1.22	1/27	24.28	23.73	0.92	1/25		
b) Computation (raw, mx=30)	28.98	26.39	15.23***	1/27	28.92	26.45	14.25***	1/25		
French Comp. Test, Gr. 1 Level	(15 classes)	(7 classes)							FCT, K Level Comp. Gr. (6 cl.)[c]	
Total[b] (mx=65)	46.11	18.73	>100***	1/20	46.40	18.10	>100***	1/18	29.41 (mx=62)	
Words (mx=10)	7.74	3.41	79.42***	1/20	7.78	3.33	78.81***	1/18	6.18 (mx=12)	
Phrases (mx=30)	21.08	8.87	>100***	1/20	21.15	8.71	>100***	1/18	14.38 (mx=28)	
Questions (mx=10)	6.58	2.26	84.65***	1/20	6.68	2.06	>100***	1/18	3.33 (mx=9)	
Stories (mx=15)	10.71	4.17	>100***	1/20	10.80	3.97	>100***	1/18	5.33 (mx=13)	
Test de Rendement en Français Grade 1 (mx=30)	13.61	-								

*** $p \leq .001$ ** $p \leq .01$

[a] Range of standard score scale given in parentheses.

[b] See footnote 8 of text.

[c] See footnote 9 of text.

TABLE 2

Unadjusted and Adjusted Means, Grade 2 (Ottawa-Carleton 1973-74)

	Unadjusted Means				Adjusted Means (covs.=age+DIQ)				Percentile Rank (Unadj. $\bar{X}$)	
	Immersion Group (14 classes)[a]	Comparison Group (14 classes)	F ratio	df	Immersion Group	Comparison Group	F ratio	df	Immer. Group	Comp. Group
Age (mos., May '74)	93.92	93.57	0.46	1/26						
Otis-Lennon DIQ (end yr)	114.21	113.13	0.39	1/26					81	79
Metro. Achiev. Test (stand. sc.)[b]										
a. Word knowledge (14-87)	58.86	60.95	1.60	1/24	58.38	61.36	6.82*	1/22	72	76
b. Word analysis (12-72)	57.12	58.81	1.38	1/24	56.82	59.06	2.87	1/22	68	75
c. Reading (9-86)	56.87	58.87	1.49	1/24	56.33	59.34	6.28*	1/22	68	72
d. Total Reading (a+c) (2-94)	57.15	59.29	1.50	1/24	56.57	59.78	7.03*	1/22	70	75
e. Spelling (35-76)	56.03	61.26	10.81**	1/24	55.74	61.51	15.13***	1/22	48	69
f. Maths Comput. (25-89)	57.38	55.10	1.14	1/25	56.76	55.68	0.39	1/23	71	58
g. Maths Concepts (23-97)	56.32	57.43	0.37	1/25	55.85	57.86	1.76	1/23	49	51
h. Maths Probl. Solv. (21-94)	58.90	59.45	0.06	1/24	58.17	60.08	1.14	1/22	58	59
i) Verbal items (raw, mx=17)	10.97	10.90	0.01	1/24	10.79	11.05	0.19	1/22		
ii) Written items (raw, mx=18)	11.31	11.43	0.03	1/24	11.04	11.66	1.51	1/22		
i. Total Maths (f-h) (6-102)	59.74	59.19	0.07	1/24	59.01	59.81	0.22	1/22	61	59
French Comp. Test, Gr. 1 Level	(10 classes)	(7 classes)							FCT, K Level Comp. Gr. (7 cl.)	
Total[c] (mx=65)	53.14	22.25	>100***	1/15	53.10	22.31	>100***	1/13	38.59 (mx=62)	
Words (mx=10)	8.90	4.02	>100***	1/15	8.91	4.00	>100***	1/13	7.28 (mx=12)	
Phrases (mx=30)	23.30	9.66	>100***	1/15	23.28	9.69	>100***	1/13	17.55 (mx=28)	
Questions (mx=10)	8.05	3.04	>100***	1/15	8.04	3.04	>100***	1/13	5.18 (mx=9)	
Stories (mx=15)	12.92	5.51	>100***	1/15	12.89	5.56	>100***	1/13	8.70 (mx=13)	
Test de Rendement en Français	(14 classes)									
Grade 2 (mx=30)	14.94	-								
Test de Lecture, 2e année (mx=19)	11.58	-								

*** p≤.001 ** p<.01 * p<.05

[a] See footnote 14 of text. [b] Range of standard score scale given in parentheses. [c] See footnote 8 of text.

TABLE 3

Unadjusted and Adjusted Means, Grade 3 (Ottawa-Carleton 1973-74)

	Unadjusted Means				Adjusted Means (covs.=age+DIQ)				Percentile Rank (Unadj. $\bar{X}$)	
	Immersion Group (9 classes)[a]	Comparison Group (10 classes)	F ratio	df	Immersion Group	Comparison Group	F ratio	df	Immer. Group	Comp. Group
Age (mos., May '74)	105.90	105.86	0.07	1/17						
Otis-Lennon DIQ (end yr)	116.30	113.14	2.14	1/17					84	79
Metro. Achiev. Test (stand. sc.)[b]										
a.Word knowledge (17-116)	71.14	70.58	0.06	1/16	69.54	71.86	2.69	1/14	76	75
b.Reading (11-118)	70.26	69.04	0.18	1/16	68.11	70.76	2.45	1/14	75	72
c.Total Reading (a+b) (3-127)	70.37	69.16	0.22	1/16	68.48	70.68	1.94	1/14	77	74
d.Language (34-136)	75.50	72.26	2.40	1/16	74.08	73.39	0.22	1/14	66	57
e.Spelling (39-94)	68.33	70.50	1.15	1/16	67.17	71.42	5.94*	1/14	65	70
f.Maths Comput. (27-106)	70.33	68.66	0.71	1/17	69.51	69.40	0.01	1/15	69	64
g.Maths Concepts (27-106)	74.41	72.86	0.50	1/16	72.98	74.01	0.56	1/14	75	72
h.Maths Probl. Solv. (24-106)	76.72	77.24	0.03	1/16	74.73	78.82	5.53*	1/14	75	77
i.Total Maths (f-h) (9-119)	77.97	77.93	0.00	1/16	76.35	79.23	3.05	1/14	72	72
Test de Rendement en Français Grade 3 (mx=30)	18.17	-								
Test de Lecture, 3e année (mx=28)	20.27	-								
IEA French Listen. II[c] (mx=40)	29.20	-								

French Comprehension Test	Comparison Group	
	K Level[c]	Gr. 1 Level[c]
Total[d] (mx=(K)62/(Gr.1)65)	31.13	24.79
Words (mx=12/10)	7.25	3.95
Phrases (mx=28/30)	13.61	10.67
Questions (mx=9/10	3.35	2.94
Stories (mx=13/15)	7.15	7.21

*** $p<.001$ * $p<.05$

[a] See footnote 17 of text.

[b] Range of standard score scale given in parentheses.

[c] Unit of analysis=individual; IEA Test - 56 pupils (3 classes); FCT-K - 28 pupils (2 classes); FCT-1 - 55 pupils (3 classes)

[d] See footnote 8 of text.

TABLE 4

Summary of French Scores, Grades 1-3 (Ottawa-Carleton 1973-74)

	Immersion Groups[a]			Comparison Groups[a,b]		
	Gr. 1	Gr. 2	Gr. 3	Gr. 1	Gr. 2	Gr. 3
French Comp. Test, K Level Total[c] (mx=62)				29.41	38.59	31.13
Words (mx=12)				6.18	7.28	7.25
Phrases (mx=28)				14.38	17.55	13.61
Questions (mx=9)				3.33	5.18	3.35
Stories (mx=13)				5.33	8.70	7.15
French Comp. Test, Gr.1 Lev. Total[c] (mx=65)	46.11	53.14		18.73	22.25	24.79
Words (mx=10)	7.74	8.90		3.41	4.02	3.95
Phrases (mx=30)	21.08	23.30		8.87	9.66	10.67
Questions (mx=10)	6.58	8.05		2.26	3.04	2.94
Stories (mx=15)	10.71	12.92		4.17	5.51	7.21
Test de Rend. en Français Gr. 1 Level (mx=30)	13.61					
Gr. 2 Level (mx=30)		14.94				
Gr. 3 Level (mx=30)			18.17			
Test de Lecture, Gr. 2 Level (mx=19)		11.58				
Gr. 3 Level (mx=28)			20.27			
IEA Fr. List, Pop. II (mx=40)			29.20			

[a] Number of classes/pupils involved:
- Gr. 1 Immersion: 15 classes throughout
- Gr. 2 Immersion: 10 classes on FCT; 14 classes elsewhere
- Gr. 3 Immersion: 9 classes on TRF and Test de Lecture; 56 pupils on IEA Test
- Gr. 1 Comparison: 6 classes on FCT-K; 7 classes on FCT-1
- Gr. 2 Comparison : 7 classes on both FCT's
- Gr. 3 Comparison: 28 pupils on FCT-K; 55 pupils on FCT-1

[b] Amount of daily French instruction in regular program:
- Grade 1: 20-30/20-40 min. in K/Gr. 1; cumulative amt: 40-70 min.
- Grade 2: 20-30/20-40/20-40 min. in Grades K/1/2; cumulative amt: 60-110 min.
- Grade 3: 15-20/20/20/20 min. in Grades K/1/2/3; cumulative amt: 75- 80 min.

[c] See footnote 8 of text